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Chinch Bugs and Their Control

1. Bugs clustered on corn. 2. Corn destroyed by migrating bugs. 3. (Inset) chinch bug nymph (greatly enlarged).

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Chinch Bugs and Their Control

THE CHINCH BUG* is a native of America and originally fed upon wild grasses. As virgin lands were plowed under and native grasses destroyed, the insect turned its attention to cultivated crops, chiefly corn, barley, wheat, and oats. This insect bears the reputation of being a serious pest during most seasons in some parts of the cornbelt.

The insect is very sensitive to weather conditions. Periods of its abundance are correlated with dry, hot summers, while prolonged rainy weather coming at the right time can almost exterminate the bugs. During the five dry summers beginning with 1930, the chinch bug rapidly increased in numbers throughout central and western Ohio. In July of 1934, the outbreak extended over forty-nine Ohio counties, resulting in serious injury to many fields of corn.

MANNER OF INJURY

In Ohio the chinch bug periodically damages corn and small grains. The insect feeds by sucking the sap from the stems of plants belonging to the grass family. When dozens of the insects are clustered on the stems of small grain plants, they cause premature ripening. Under lighter attack the plants are able to withstand the injury, but the toll taken by the pest is greater than the visible evidence indicates. Injury to the corn plants is shown by the dying of the lower leaves, which may be followed by the collapse of the entire plant, provided the insects are very numerous.

During years of chinch bug abundance, the corn may show evidence of the work of the insects for several rods into a field. This injury is always most severe next to fields of small grain, where the bugs develop and from which they migrate to corn. The massing of the bugs on the stalks of corn continues for about three weeks during July, after which the bugs develop wings and scatter throughout the corn field. A second generation of bugs is present in the corn throughout the later part of the summer, but its injury is largely overlooked because the bugs are distributed over the entire corn field.

HABITS OF THE INSECT

Chinch bugs pass the winter in the adult stage. They can be found in the fallen leaves of woodland and in the dense grass of roadsides, fence rows, and ditch banks. Very few are found in the corn fields where they last fed. In searching for overwintering chinch bugs one must look in the loose leaves of woodland where they will be found on the lower layer of dry leaves, also in dense clumps of timothy or wild grasses, and under loose bark of posts, and logs.

Low winter temperatures do not seem to affect the adult bugs, as they can be frozen in wet debris, or even in ice, without causing their death. Fig-

* *Blissus leucopterus* Say.

ure 3 shows several hundred chinch bugs frozen in a cake of ice. Field counts made by the author reveal that a high percentage of the bugs which enter hibernation are alive the following spring.

The adult chinch bugs fly out of their winter quarters during the month of May and are scattered by the wind indiscriminately over small grain fields. No field of wheat, barley, or oats is exempt from their attack, although some grain fields seem to acquire more of the overwintering bugs than others. The adults feed upon the young plants and lay their eggs beneath the lower leaf-sheath or on the roots. Egg-laying occurs late in May and throughout June. The overwintering adults then die and the bugs of the first generation develop in the small grain, where they cluster on the stems of wheat, barley, oats, and some grasses. Lovers of drouth, they thrive under hot, dry conditions, crawling in the cracks of the ground to escape the high temperature and feeding upon the stems in the shade of the plant.

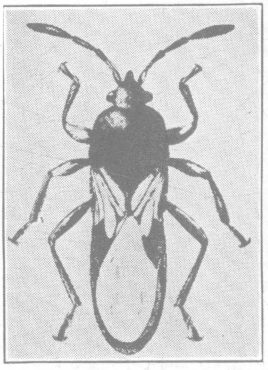

Fig. 1.—Adult chinch bug (greatly enlarged) (U.S.D.A.)

When the wheat and rye mature, the chinch bugs are usually from one-fourth to three-fourths grown and have not developed wings. They will then crawl from the small grain to adjoining corn, where the hungry bugs cluster upon the green stems and suck the sap from the plants. If the corn is late in its development and the bugs are numerous, they may destroy several rows before the farmer is aware of their presence. If the plants are tall and vigorous, they may withstand the attack, but the lower leaves turn yellow and the plants become stunted. Each day the young chinch bugs move farther into the corn, commencing their migration on the ground about noon and continuing until near sun-down.

During the month of July, bugs of all sizes may be found in the corn field and in fence rows adjacent to the small grain where they hatched. By the middle of the month some have matured and develop wings, while others have just hatched. By the end of July most of the bugs have developed wings and have spread over the entire corn field, where they will be found feeding. During August the bugs feed upon the corn, where they collect on the stalks and undersides of the lower leaves to protect themselves from the hot sun. Here another generation of young is reared, but their presence is not conspicuous owing to the size of the corn plant and the bugs being scattered over the entire acreage. The very young bugs are a bright red color with a transverse band of white. As they mature, they change to dark gray with white markings, and finally, in the adult stage they are black with white markings, and about one-sixth inch long.

The chinch bugs are again noticed by the farmer at silo filling time, when the second generation has matured in the corn. Late in the fall, when the corn no longer offers food, the bugs fly or crawl to nearby winter quarters, being most abundant in the grassy and leaf covered areas next to the corn field, and especially at the edge of woodland.

CONTROL OF THE CHINCH BUG

Natural Control

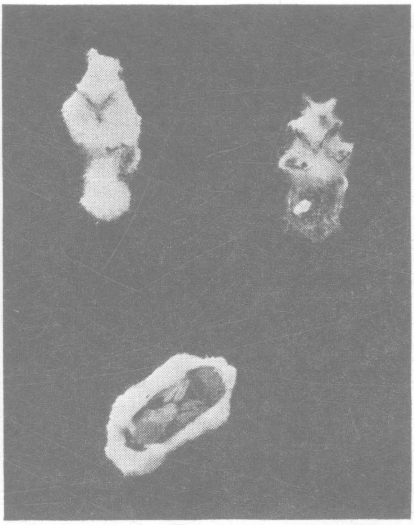

Fig. 2.—Chinch bugs killed by a fungous disease. Dead bugs are covered with the white fungus.

Courtesy U. S. Dept. Agriculture.

During most seasons the summer rainfall in Ohio serves as an automatic check on this insect. Dashing rains during June kill many of the newly hatched bugs before they become large enough to do much damage. During long wet periods, with high relative humidity, a *fungous disease** of chinch bugs puts in its appearance, and may prevent what appears to be a destructive outbreak.

This fungous disease attacks many insects under high moisture conditions and leaves their dead bodies covered with a white mold. On rare occasions the disease is so effective as to leave the ground literally speckled with the white fungus covered bodies of the bugs.

The possibilities of cultivating this fungus artificially and transplanting it to fields during chinch bug outbreaks have been thoroughly investigated. It has been found that this fungus is always present in sufficient amounts to inoculate a heavy population of chinch bugs, and needs only favorable weather conditions to bring this about. The introduction of a package of diseased or dead bugs at several points in a grain field merely results in wasted effort. Thus the artificial dissemination of so-called chinch bug disease has long ago been discontinued.

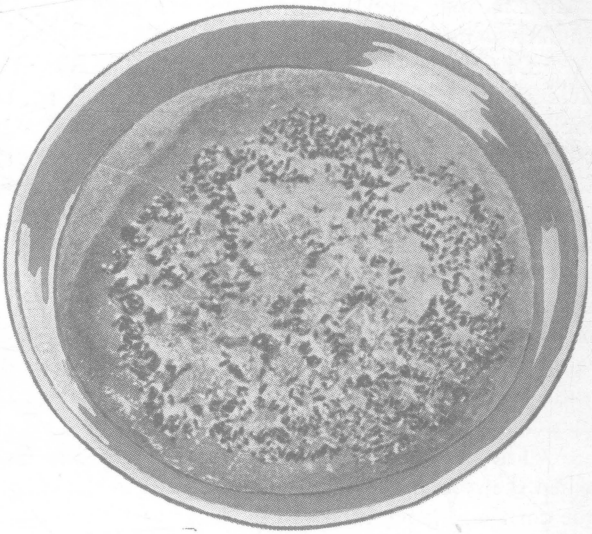

Fig. 3.—Chinch bugs frozen in a cake of ice. Bugs were unharmed when ice melted. Cold winters do not control chinch bugs.

While weather and the fungous disease constitute the most effective control agencies, and usually suffice to keep the insect un-

* *Sporotrichum globuliferum.*

der control in Ohio, there are times when the grower must follow certain practices to protect his crops. These practices are designed to reach the bugs either in their hibernation quarters, where they are frequently assembled in a rather small area, or to trap them as they migrate on the ground out of small grain fields during July, and thus prevent their injuring nearby corn.

Burning Hibernating Places

During the autumn, following a heavy increase of chinch bugs, the farmer should make an examination of the dense grass found growing in fence rows, roadsides, and ditch banks (see Fig: 4), and also scan carefully the fallen leaves at the edge of woodland or fence rows where windblown leaves have collected. Following abnormally dry seasons, one is likely to find plenty of overwintering chinch bugs in these situations. The most inexpensive and timely control method consists of burning over these areas between November and April, when the grass and other ground cover is dry.

The fire should be set against a light breeze rather than run with the wind. If the grass burns close to the ground, the fire will destroy most of the chinch bugs. Burning should be carried out on a community basis. One farmer cannot hope to accomplish much through burning hibernating places in his fields unless the practice is general.

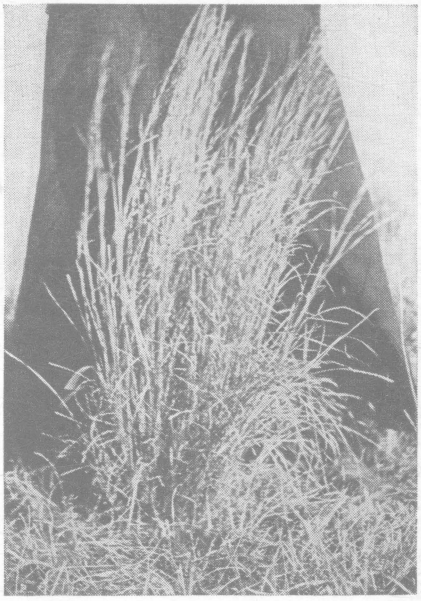

Fig. 4.—Clumps of dense grass furnish ideal hibernating places for adult chinch bugs. The grass should be burned in late fall or early spring, when well dry.

Trapping During Migration

The migration of the young bugs out of small grain fields coincides with the maturity of the wheat or the drying up of the barley and oats. At this time they crawl out of a wheat or barley field and cross a fence row, lane, or even a road to reach succulent food. If a field of corn joins the wheat stubble field, or uncut barley, bugs will assemble on the corn until they have covered the lower part of the stalk. As the first bugs are reinforced by others coming from the field of small grain, competition for food becomes great, and they crawl farther and farther into the corn field. This migration from small grain to corn usually continues for a period of two or three weeks.

To the average person the above situation would seem to be too discouraging to attempt control. However, the use of suitable barriers to stop the bugs, and trap them into furrows or post holes, can be depended upon to stop the migration of the insects and protect the corn. The secret of success with barriers lies in their proper construction and maintenance.

Dusty Furrow.—This is the oldest known method of fighting the chinch bug. It consists of plowing a furrow along the edge of the corn field to be protected, or, if the first rows of corn are already covered with bugs, the furrow is made between two rows of corn beyond the migrating insects. After a deep furrow is opened it is allowed to dry for several hours, then a log about 8 inches in diameter is dragged along in the bottom of the furrow to pulverize the soil and create a fine dust. This converts the furrow into a groove with gently sloping sides. Such a furrow, however, will NOT stop the bugs even in the driest weather, because after the bugs fall into it they are able to crawl up the ascending slope.

To prevent the chinch bugs from getting out of the furrow, it is necessary to undermine the slope towards the corn, making it as perpendicular as possible. In such a furrow the bugs are unable to crawl up the slope because of the dust particles giving way under them. It is necessary to repair the furrow daily by the use of a hoe, and to keep the dust hanging on the slope.

The dusty furrow is very effective during dry weather in clay loam soils. At best, however, it is only an emergency measure. Unless the bugs are killed in the furrow each day they will get across after a rain settles the dust.

The trapped bugs can be killed in the furrow by digging shallow post holes in the bottom of the furrow at intervals of 15 to 20 feet. The bugs fall into the post holes and are unable to get out, provided a rim of dust is present around the top. After the bugs accumulate in the bottom of the hole a teaspoon of calcium cyanide can be sprinkled on them. Still another method consists of spraying the bugs with kerosene as they collect each day in the bottom of the post hole.

Effective dust barriers cannot be made in some types of waxy soil. Neither are they effective during rainy weather. Should rains destroy the dust, the grower must be prepared to substitute a tar line or creosote line.

Tar or Creosote Line.—This type of barrier consists of a narrow line of tar or creosote laid down in front of the first rows of corn to be protected. In this type of barrier, the odor of the creosote repels the migrating bugs. Where crude creosote can be obtained, such as from wood treating plants, it is the most effective material to use for a barrier. Where creosote is not available, or the price is prohibitive, ordinary coal tar can be used. This is available at artificial gas plants, and when used by Ohio farmers has served very well in repelling chinch bugs, though frequent renewal is necessary.

This thin tar contains a high percentage of creosote, which gives it its value as a repellent. Both tar and creosote sink into the ground and the line must be renewed frequently enough to maintain its effectiveness. This means that it must be replaced twice each day in the beginning on porous types of soil. Later, it need not be replaced more than once every second or third

day. It will take about 40 gallons of tar to build and maintain 80 rods of line through the average period of chinch bug migration.

Crude creosote usually can be obtained from 30¢ to 40¢ per gallon at wood preserving plants. Tar from the artificial gas plants sells from 8¢ to 10¢ per gallon at the plants.

A tar or creosote line functions best on compacted soil. Some farmers prepare a base for it by dragging a stone boat or mud boat between two rows of corn. Shallow post holes should be used with the tar line and should be dug at intervals of 15 to 20 feet along the smoothed surface before the tar line is laid.

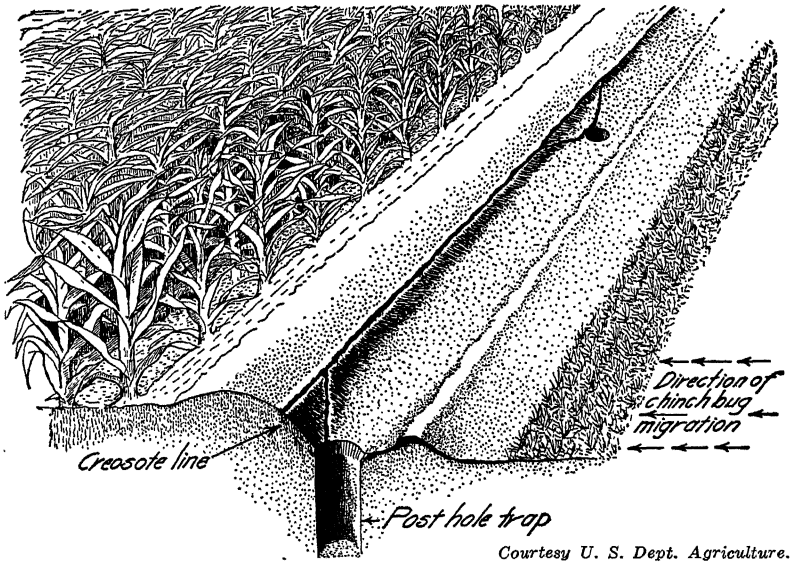

Fig. 5.—A combination dust and tar barrier used to stop crawling chinch bugs.

For convenience in laying a line of tar, a box nail is driven into the side of a pail near the bottom. The hole is then stopped with a plug driven from the outside and the pail filled with tar or creosote. The operator then begins at the first post hole, where the plug is removed, and walks along at a sufficient rate of speed to lay down a line of tar about one inch wide. The line is directed to skirt the front edge of the post holes so that the migrating bugs, repelled by the tar, will fall into the holes as they collect behind the line. Each day the bugs that collect in the post holes are killed with oil or calcium cyanide. One grower, who required over one mile of tar line, mounted a barrel of gas tar on his truck and, by means of a small rubber tube leading from the stop-cock of the barrel, conducted the stream of tar to the ground just back of one rear wheel. The hose was fastened to the fender and extended close to the ground so that the line of tar was rapidly laid down in the compacted wheel track as the truck was driven through the field.

Combination Barriers.—Sometimes the dust furrow and tar lines are used jointly to turn back the bugs. This is an economical plan to follow, relying upon the dust in dry weather and skirting the top of the furrow with a tar line just as soon as rain comes. Many farmers have protected their corn by the intelligent use of such a combination barrier. Care should be taken not to lay the line of tar in a furrow where dust or leaves can blow over it. In making the combination barrier, the tar line should be placed at the top of the ascending slope (see Fig. 5).

Paper Barrier.—Iowa farmers used paper barriers successfully in 1934. Such a barrier consists of a creosoted strip of red rosin building paper or single faced corrugated building paper cut 4 inches wide and set with one edge buried in the soil. The rolls are prepared by soaking for an hour or more in creosote and then are allowed to drain. When dry, they are taken to the field, unrolled, and set on edge in a 2-inch furrow prepared in the loose soil. Held in place by loose earth, the wall of paper serves as an effective barrier. In 24 hours these paper barriers give off about one-third of the creosote absorbed. This requires that they be replenished with creosote at intervals. The method saves about 50 per cent of the creosote required for earth soaked lines, and the paper will last through the migrating season if kept in good repair. Tarred felt paper is satisfactory, but more expensive. This must also be soaked with creosote. Asphalt treated tar paper is not satisfactory. Post hole traps must be used in connection with paper barriers.

Spraying as a Control

When the chinch bugs are discovered on the corn before it has been seriously damaged, the bugs may be killed by directing a contact spray against them. This spray must strike the bodies of the bugs, which means it is necessary to direct the spray against both sides of the plant. This is a slow and laborious process. Spraying is advocated only for small garden plantings and for killing the bugs that have traveled beyond a barrier that is functioning. It is futile to attempt to control with sprays where no barrier prevents the bugs from entering. Under such conditions the oncoming bugs will soon discourage the operator. After the barrier is in working order, sprays can be resorted to and should be confined to the corn in front of the barrier.

The spray found most effective is a strong solution of nicotine sulfate and soap. This is made by placing 2 teaspoons of 40 per cent nicotine sulfate with 1 gallon of water in which a small amount of soap has been dissolved. One should avoid applying the spray in the heart of the plant.

Sprays carrying Paris green or arsenate of lead are of no value against chinch bugs. Kerosene emulsion is likely to injure the corn plant.

Warning

In handling creosote oil one should protect the exposed parts of the body against splashing and fumes from this liquid. Constant exposure to the fumes greatly irritates the skin. Leather gloves should be worn when pouring creosote.